

ART II.—*Acceleration of Gravity at the Melbourne Observatory; Supplementary Note.*

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The present note is a necessary supplement to my paper of last year on Gravity Determinations in Australia, as the subsequent appearance of Wright's² memoir has reopened the question as to the most probable value of g for Melbourne.

Wright employed three of the five pendulums previously swung in Melbourne by Hecker, and also made use of the same coincidence clock as that observer. In view of the facts that (a) Wright carried out 18 sets of observations as against Hecker's 30 sets (b) the coincidence clock kept much the steadier daily rate during Hecker's observations (c) Wright's measures show, on analysis, a small but well-marked diurnal variation, differing in character for the different pendulums, it seems reasonable to assign to Wright's determination half the weight of Hecker's. Combining this estimate with those utilised in my previous paper, the table of results for Melbourne is as follows:—

TABLE.

Observer.	Value of g .	Weight.	Difference from Weighted Mean.
Baracchi-Love	979.977	0.5	— .011
Muller v. Elblein . . . . .	.991	1.0	+ .003
Gubertth . . . . .	.997	1.0	+ .009
Hecker . . . . .	.985	2.0	— .003
Alessio . . . . .	.985	1.5	— .003
Wright . . . . .	.991	1.0	+ .003
		Weighted mean:	979.988
		Mean error:	\pm .0023.

Hence we have for Melbourne Observatory

$$g = 979.988 \pm .002 \text{ cm. sec.}^{-2};$$

which becomes, on reduction to sea-level,

$$g = 979.996 \text{ cm sec.}^{-2},$$

and after applying Bouguer's correction

$$g_0'' = 979.993 \text{ cm sec.}^{-2}.$$

In view of the considerable variations, progressive and temporary, shown by the papers of the Potsdam observers, to have occurred in the periods of the pendulums employed, the differences between the results of Wright, Hecker and Alessio, both for Melbourne and Sydney, are nearly of the order of the instrumental uncertainties; Wright's suggestion that they may be due to actual variations of gravity seems unnecessary.

1. Love, P.R.S. Viet., xxxv. (N.S.), p. 90.

2. C. S. Wright, Determinations of Gravity, British (Terra Nova) Antarctic Expedition.